

CLAIMS

We claim:

1. A transponder comprising:

a transponder memory having a transponder data location with a data value; and

a transponder receiver for receiving a signal, the signal having sent data and the receiver writing the sent data to the transponder data location, the transponder sending a response if the sent data is different than the data value and the tag antenna not sending a response if the sent data is the same as the data value.

2. A radio frequency tag comprising:

a tag antenna for receiving a radio frequency signal from a base station, the radio frequency signal having sent data;

a tag memory having a tag data location with old data;

a tag logic having an active state and an initialize state, a Select Command placing the tag in the active state if the tag meets a select condition and an Unselect Command placing the tag in the initialize state if the tag meets an unselect condition;

a tag receiver for receiving the radio frequency signal from the tag antenna, the tag writing the sent data to the tag data location if the tag is in the active state and the tag not writing the sent data to the tag data location if the tag is in the initialize state.

2β. A tag, as in claim 2, where writing the sent data occurs in the tag without the tag sending a response containing a tag identifier.

3A. A tag, as in claim 2, where the tag further comprises a decoder that decodes an Any Tag command that causes the tag to communicate a response when the tag is in the active state and that causes the tag not to communicate a response when the tag is in the initialize state.

4s. A radio frequency tag comprising:

a tag antenna for receiving a radio frequency signal from a base station, the radio frequency signal having zero or more sent data and zero or more of the sent addresses corresponding to the sent data;

a tag receiver for decoding each of the sent data and the sent addresses from the radio frequency signal;

a tag memory having one or more tag data locations, each tag data location having a respective tag data address; and

a tag receiver for receiving the radio frequency signal from the tag antenna; and

a tag logic having an active state and an initialize state, a Select Command placing the tag in the active state if the tag meets a select condition and an Unselect Command placing the tag in the initialize state if the tag meets an unselect condition, the tag logic writing each of the sent data in the tag data location with the tag data address corresponding to the respective sent address if the tag is in the active state and the tag not writing any of the sent data if the tag is in the initialize state.

5/6. A base station for communicating with zero or more tags in a field of the base station, each of the tags having a tag memory, the base station comprising:

a signal generator that develops a signal containing a sent data;

a base station transmitter that encodes the signal on the carrier to create an encoded signal; and

a base station antenna that transmits the encoded signal to two or more tags in the field causing the tags to simultaneously write the sent data into the tag memory and listens for a response from one or more tags, the response causing the base station transmitter to retransmit the encoded signal.

7. A base station, as in claim 6, where the sent data includes any one of the following types of information for an: object identification, object description, object use, object tracking, object location, object status, and object handling.

6/8. A base station for communicating with zero or more radio frequency tags in a field of the base station, each of the tags having a tag memory, the tag memory

having one or more tag data locations and each of the tag data locations having a tag data address, the base station comprising:

a computer that develops a select command and a write broadcast signal, the write broadcast signal containing zero or more write broadcast commands, zero or more sent data and zero or more sent addresses;

a base station transmitter that encodes the select command on a radio frequency carrier to create a select signal and encodes the write broadcast signal on the radio frequency carrier to create a write signal; and

a base station antenna that transmits the select signal to all the tags in the field to select a subgroup of the tags, and subsequently transmitting the write signal to simultaneously write each of the sent data to the tag data locations having tag data addresses corresponding to the sent addresses.

19. A radio frequency tagging system comprising:

zero or more radio frequency tags, each tag having a tag logic, a tag antenna, and a tag data location; and

a base station having a signal generator, a transmitter, and a base antenna, the signal generator sending a carrier signal through the transmitter and base antenna to create a field, the transmitter encoding sent data generated by the signal generator onto the carrier signal to produce an encoded carrier signal, zero or more tags in the field receiving the carrier signal through their respective tag antennas and the tag logic of each tag in the field decoding the sent data and caus-

ing the sent data to be simultaneously written to the respective tag data location, the tag logic causing the tag to send a response if the sent data is different than an old data in the tag data location and not send the response if the sent data is the same as the old data, the base station resending the encoded carrier signal if a response is received from one or more of the tags.

10. A radio frequency tagging system, as in claim 9 where the tags do not respond to the write broadcast command.

8/11. A radio frequency tagging system comprising:

zero or more radio frequency tags, each tag having a tag logic and a tag antenna and each tag further having one or more tag data locations associated with a tag data address;

a base station having a computer, a transmitter, and a base antenna; and

a process executed by the computer that causes a radio frequency write broadcast signal to be sent through the transmitter and base antenna to create a field, the write broadcast signal having two or more pairs of sent data and a sent address corresponding to each of the sent data, one or more tags in the field receiving the write broadcast signal through the tag antenna and the tag logic of each tag in the field causing the sent data to be simultaneously written to each of the tag data locations that has a tag data address matching the respective sent address.

9/12. A system, as in claim 11, where the tag logic causes the tag to send a response if the sent data is different than an old data in the tag data location and not send

the response if the sent data is the same as the old data, the base station resending the encoded carrier signal if a response is received from one or more of the tags.

13. A radio frequency tagging system, as in claim 11, where the tags do not respond to the write broadcast command.

10 14. A radio frequency tagging system, as in claim 11, where the base station sends a group unselect command and one or more of the tags that has an old data in the tag data location that does not equal the sent data sends a response to the group unselect command to the base station.

11 15. A system, as in claim 11, where the sent data includes any one of the following types of information for an: object identification, object description, object use, object tracking, object location, object status, and object handling.

12 16. A method performed by a base station comprising the steps of:

a. selecting a sub group of zero or more tags in a field of tags by sending a select command, only the tags in the sub group enabled to write a sent data to a respective tag memories of the tag;

b. sending a radio frequency signal, the signal having sent data and causing zero or more of the tags in the field to simultaneously write the sent data to a tag memory in the tags in the subgroup.

13 17. A method performed by a base station comprising the steps of:

a. sending a radio frequency signal to a field of zero or more radio frequency tags, the signal having one or more pairs of sent data and sent addresses, each sent address associated with a sent data, and the signal causing zero or more of the tags in the field to write each of the sent data to a tag data location in a tag memory in zero or more tags, the tag data location having a tag data address equal to the sent address associated with the respective sent data; and

issuing an Unselect command that causes the tags in the field to respond if a value in the each of the tag data locations with tag data addresses corresponding to the sent addresses does not equal the respective sent data.

14 18. A method, as in claim ¹³17, where the base station re-sends the radio frequency signal if a response is received.

15 19. A method, as in claim ¹³17, where there is no sent address in one or more of the pairs and the respective tag data locations are pre-assigned.

16 20. A method, as in claim ¹³17, where there is one sent address that is paired with more than one of the sent data.

17 21. A radio frequency tag comprising:

a tag antenna means for receiving a radio frequency signal from a base station, the radio frequency signal having sent data;

a tag memory means for having a tag data location; and

a tag receiver means for receiving the radio frequency signal from the tag antenna and writing the sent data to the tag data location; and

a tag transmitter means for sending a response if the sent data is different than an old data in the tag data location.

22. A base station for communicating with a zero or more radio frequency tags in a field of the base station, each of the tags having a tag memory, the base station comprising:

a signal generator means for developing a signal containing sent data;

a base station receiver;

a base station transmitter means for encoding the signal with the sent data on a radio frequency carrier to create an encoded carrier; and

a base station antenna means for transmitting the encoded carrier to zero or more tags in the field causing the tags to simultaneously write the sent data into the tag memory, the base station antenna means transmitting a second encoded carrier if the base station receiver detects a response.

23. A radio frequency tag comprising:

a tag antenna for receiving a radio frequency signal from a base station, the radio frequency signal having sent data, and the tag antenna further for communicating one or more responses to the base station;

a tag memory having a tag data location with old data;

a tag logic having an active state and an initialize state, a Select Command placing the tag in the active state if the tag meets a select condition and an Unselect Command placing the tag in the initialize state if the tag meets an unselect condition, where the tag in the active state that receives an Unselect Command and does not meet the unselect condition communicates one of the responses through the tag antenna to the base station;

a tag receiver for receiving the radio frequency signal from the tag antenna, the tag writing the sent data to the tag data location if the tag is in the active state and the tag not writing the sent data to the tag data location if the tag is in the initialize state.

19/24. A tag, as in claim ¹⁸~~23~~, where writing the sent data occurs in the tag without the tag sending a response containing a tag identifier.

20/25. A tag, as in claim ¹⁸~~23~~, where writing the sent data causes the tag to send the response.

21/26. A tag, as in claim ¹⁸~~23~~, where writing the sent data causes the tag to send the response if the sent data is different from the tag memory data.

27. A base station for communicating with a plurality of tags in a field of the base station, each of the tags having a tag memory, the base station comprising:

a signal generator that develops a signal containing a sent data;

a base station transmitter that encodes the signal on the carrier to create an encoded signal; and

a base station antenna that transmits the encoded signal to zero or more tags in the field causing the tags to simultaneously write the sent data into the tag memory, sends a group unselect command that unselects tags that have the sent data in their respective tag memory, and listens for a response from one or more tags.

28. A base station, as in claim 27, where the response causes the base station transmitter to retransmit the encoded signal.

29. A base station, as in claim 27, where the response causes the base station to generate an error code.

30. A base station for communicating with a plurality of radio frequency tags in a field of the base station, each of the tags having a tag memory, the tag memory having one or more tag data locations and each of the tag data locations having a tag data address, the base station comprising:

a computer that develops an unselect command and a write broadcast signal, the write broadcast signal containing zero or more write broadcast commands, zero or more sent data and zero or more sent addresses;

a base station transmitter that encodes the unselect command on a radio frequency carrier to create a unselect signal and encodes the write broadcast signal on the radio frequency carrier to create a write signal; and

a base station antenna that transmits the unselect signal to all the tags in the field to unselect a subgroup of the tags, and subsequently transmitting the write signal to simultaneously write each of the send data to the tag data locations having tag data addresses corresponding to the sent addresses.

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²³31. A method performed by a base station comprising the steps of:

a. selecting zero or more the tags in a field of tags by issuing one or more select and zero or more unselect commands, the selected tags becoming active and the not selected tags to remain initialized;

b. issuing an unselect command that causes unselected tags to become initialized if the value in each of the tag data locations with tag data addresses corresponding to the sent address equal to the send data, and to remain active and respond if the value in any of tag data locations does not equal the sent data; and

c. issuing a write broadcast command if any response is received to step b.

²⁴32. A method, as in claim ²³31, comprising the further step of:

d. repeating steps b and c until no tags respond.

2533. A method, as in claim ¹³31, comprising the further step of:

d. repeating steps b and c until an allowed number of iterations is reached.

34. A method performed by a base station comprising the steps of:

a. selecting zero or more the tags in a field of tags by issuing one or more select and zero or more unselect commands, the selected tags becoming active and the not selected tags to remain initialized;

b. issuing an unselect command that causes unselected tags to become initialized if the value in each of the tag data locations with tag data addresses corresponding to the sent address equal to the sent data, and to remain active and respond if the value in any of tag data locations does not equal the sent data; and

c. issuing a write broadcast command if any response is received to step b.

35. A method, as in claim 34, further comprising the step of:

d. repeating steps a, b and c until no tags respond.

36. A method, as in claim 34, further comprising the step of:

d. repeating steps a, b and c until an allowed number of iterations is reached.

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